NOVEMBER/DECEMBER 2025

23UEIM42A — STATISTICAL METHODS AND ITS APPLICATIONS II

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

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1. Define correlation.
2. State two properties of correlation coefficient.
3. Write the formula for Karl Pearson's coefficient of correlation.
4. Define regression.
5. State one difference between correlation and regression.
6. Define Index Number.
7. List two characteristics of Index Numbers.
8. What are the components of a time series?

9. Define interpolation.

10. Write Newton's forward interpolation formula.

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SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Calculate the Karl Pearson's correlation coefficient between the marks in Maths and Statistics given below:

Maths: 35, 40, 50, 60, 65

Statistics: 30, 35, 48, 52, 63.

Or

(b) Find the Spearman's rank correlation for the following data:

A: 1,2,3,4,5

B: 2, 1,4,5,3.

12. (a) Compute regression coefficients (bxy and byx) from the following data:

$\sum X = 30$, $\sum Y = 50$, $\sum XY = 210$,

$\sum X^2 = 190$, $\sum Y^2 = 350$, $N = 10$.

Or

19. Fit a straight line trend by the least squares method for the data:

Year :	2015	2016	2017	2018	2019
Sales :	100	120	130	150	170

20. Using binomial expansion, interpolate the missing values in the given data series.

(b) Compute Fisher's Ideal Index and verify Time Reversal Test from the following:

Commudity	Base Year Price	Current Year Price	Base Year Quantity	Current Year Quantity
A	10	12	5	6
B	8	10	10	12

13. (a) Construct an unweighted index number by Simple Average of Price Relatives for the following:

Commodity	Price in 2010	Price in 2020
A	20	30
B	40	50
C	10	15

Or

(b) Fit a straight-line trend to the following data using method of semi-averages :

Year :	2015	2016	2017	2018	2019	2020
Sales :	45	50	52	55	60	62

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14. (a) From the following data, compute 3-year moving averages:

Year :	2016	2017	2018	2019	2020	2021
Production :	120	135	150	165	180	195

Or

(b) Estimate $y(4)$ using Newton's Forward Interpolation from the following table:

x	1	2	3	5
y	1	8	27	125

15. (a) Using Lagrange's method, find $f(3)$ from:

x :	1,	2,	4
$f(x)$:	1,	4,	16

Or

(b) Apply Lagrange's interpolation formula for the given data.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Calculate Karl Pearson's correlation coefficient from the following:

X :	10	20	30	40	50
Y :	15	25	28	35	40

17. The two regression equations are given as:

$8X - 10Y + 66 = 0$ and $40Y - 18X = 214$.

Find:

(a) Mean of X and Y,

(b) Regression coefficients,

(c) Correlation coefficient.

18. Construct a weighted index number for the following data using Laspeyres and Paasche methods.

Commodity	Price in 2010	Price in 2020	Quantity in 2010	Quantity in 2020
A	5	10	20	25
B	4	8	15	20